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# Tampering of opioid analgesics: a serious challenge for public health?

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*Tampering with opioid analgesics for misuse is an emerging and complex drug problem, responsible for serious harms including dependence and overdose. There is a need to better detect and monitor signals of misuse in order to produce better data to inform public health.*

The tampering of opioid analgesics for misuse is becoming a serious challenge for public health. The number of reports of tampering is increasing and serious harm, including fatal overdoses, has already been recorded [1-3]. However, as misuse of medicines becomes an increasingly complex problem, a major concern is that early warning systems and drug surveillance systems are poorly configured for detecting the misuse of medicines [4,5]. This too includes cases of tampering, resulting in limited ability to respond with appropriate public health measures.

Although tampering involves different opioids, the aim is the same: to enhance the psychoactive effects by raising the maximum drug concentration in the blood and/or reducing the time it takes from administration to maximum drug concentration. Techniques vary, but include extraction of opioids from combination medicines (opioid/non-opioid analgesic) [6]; chewing, snorting, smoking, and injecting crushed tablets, such as oxycodone, codeine, buprenorphine, and morphine [1,3]; smoking and injecting fentanyl extracted from skin patches and placing whole or parts of patches in the mouth [7,8]; and, conversion of one opioid into a more potent one — such as transforming codeine into morphine, codeine into desomorphine, and morphine into heroin [6].

Detecting new signals in tampering is complicated for several reasons. One has to do with the marked rise in the use of opioids for both acute and chronic pain in many countries worldwide [5,9,10]. Over-medication of certain types of pain, inappropriate prescribing, ‘pill mills’ in the US, combined with the marketing of new prescription opioids and patients’ expectations of immediate pain relief, contribute to the trend [5,11]. This leads to increased availability of opioids and to higher levels of diversion, misuse, and tampering. Tampering-resistant formulations of prescription opioids have been introduced, in particular in the US, and studies have shown that users rate them as less desirable for tampering [12,13]. Still there is a lack of data on the impact these formulations have in the real world and a concern that individuals simply shift to other opioids, including heroin, fentanyl, and new psychoactive substances such as acetylfentanyl and U-47700 [14].

The situation is further complicated by the tampering of opioids sold lawfully by pharmacies without a medical prescription in a number of European countries and

elsewhere. In many countries, no national system is in place to monitor sales of opioids without a medical prescription, leaving it up to pharmacists to identify 'pharmacy shopping' and withhold sales. Notable is tampering with low-strength codeine tablets, containing codeine and a non-opioid analgesic, such as ibuprofen, paracetamol, or acetylsalicylic acid. We recently extracted codeine from 'over-the-counter' preparations with simple household utensils like coffee filters and recipes we found on the Internet. Our study showed that it was possible to separate codeine from the accompanying non-opioid analgesics, thus allowing for consumption of large codeine doses without toxic doses of ibuprofen and paracetamol [15]. The results also indicated that codeine extraction was ineffective in some formulations, and that the amounts of active substances, codeine and non-opioid analgesics, varied in tampering products. Unknown drug concentrations in the tampering solutions can be the cause of accidental overdoses.

Another existing challenge is that tampering procedures often emerge as the result of experimental drug use amongst hidden and closed-off populations on the Internet or in 'real-life'. These populations can be difficult to identify and penetrate and hence tampering methods may escape detection until they are exposed in reports of harm [16]. It is possible that increasing monitoring of prescribing to reduce 'doctor shopping' and take-back schemes of unused medicines could lower diversion and tampering. Presently, however, approaches to reduce harm from medicine tampering are mostly reactive.

Tampering procedures perceived as effective can diffuse from early adopters into larger populations where they gain a stronger foothold. The Internet undoubtedly plays a huge role in this process. In a 2003 study, Fleming et al. [17] noted: 'At present there is no evidence to suggest that there is widespread use or knowledge of the separation of codeine from combination products using the [tampering] technique investigated'. Today recipes for codeine extraction are widely available on the Internet, including from high-profile websites such as YouTube where some videos of codeine extraction have more than 500,000 views. In order to capture such signals, systems to detect harm will have to utilise methods of online data mining.

Alongside the continued use of controlled drugs, hundreds of new psychoactive substances have appeared on the market [18], new substances and complex drug regimes for human enhancement have been recorded [19], and a range of prescription medicines are diverted toward inappropriate use. Tampering with opioid analgesics creates additional problems. The result of these developing and concurrent trends is a much more

complex situation than previously faced, challenging policies and existing approaches for detecting harm.

This highlights a need to detect, understand, prioritise, and react to signals across different substances and drug-related behaviours. Although tampering was identified at an early stage of its appearance, it was also allowed to establish itself as a serious problem. Early warning systems and monitoring systems at the national and European levels need to be receptive to emerging issues by expanding both their scope and coverage to ensure that action is taken to signals before they become trends. This will not be an easy task. Yet systematic data collection on drug signals, accessible and coordinated across nations, is a positive step to strengthening the public health response.

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